

We claim:

1. A supported distributed Bragg reflector, comprising:
 - a substrate;
 - a nucleation layer deposited on said substrate;
 - an interlayer deposited on said nucleation layer, said interlayer comprising a material selected from AlN, $\text{Al}_x\text{Ga}_{1-x}\text{N}$, and AlBN, where $0 < x < 1$; and
 - multiple pairs of (Al,Ga,B)N/(Al,Ga,B)N layers deposited on said interlayer, thereby forming a supported distributed Bragg reflector.
2. The supported distributed Bragg reflector of claim 1 further comprising an interlayer deposited between two of said multiple pairs of (Al,Ga,B)N/(Al,Ga,B)N layers.
3. The supported distributed Bragg reflector of claim 1 wherein said substrate comprises a material selected from sapphire, silicon, silicon carbide, lithium gallate, lithium aluminate, and lithium nitrate.
4. The supported distributed Bragg reflector wherein said nucleation layer comprises a GaN material.
5. The supported distributed Bragg reflector of claim 4 wherein said nucleation layer has a thickness greater than approximately 0.5 microns.
6. The supported distributed Bragg reflector of claim 1 wherein said interlayer has a thickness greater than approximately 20 Angstroms and less than approximately 1000 Angstroms.
7. The supported distributed Bragg reflector of claim 1 wherein said pairs of (Al,Ga,B)N/(Al,Ga,B)N layers comprise layers each with a (Al,Ga,B)N layer with a thickness of greater than approximately 20 Angstroms and less than approximately 1000 Angstroms and a (Al,Ga,B)N layer of greater than approximately 20 Angstroms and less than approximately 1000 Angstroms.
8. The supported distributed Bragg reflector of claim 1 wherein said interlayer material further comprises a dopant, said dopant selected from less than approximately 1% by weight of calcium, zinc, silicon, magnesium, carbon, bismuth, oxygen, antimony, and indium.

9. The supported distributed Bragg reflector of claim 1 wherein said pairs of $(\text{Al}, \text{Ga}, \text{B})\text{N}/(\text{Al}, \text{Ga}, \text{B})\text{N}$ layers comprise $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$ layers, where $0 < y < 1$.
10. The supported distributed Bragg reflector of claim 9 wherein said multiple pairs of $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$ layers number more than 50 pairs and less than 70 pairs, wherein at least one additional interlayer is interspersed between said multiple pairs of $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$ layers.
11. The supported distributed Bragg reflector of claim 10 wherein the distributed Bragg reflector has a reflectivity value greater than 0.99.
12. The supported distributed Bragg reflector of claim 1 wherein said interlayer results in an initial compressive growth stress.
13. A supported distributed Bragg reflector, comprising:
 - a substrate;
 - a GaN nucleation layer deposited on said substrate, said GaN nucleation layer having a thickness greater than approximately 0.5 microns;
 - a first interlayer deposited on said nucleation layer, said interlayer comprising a material selected from AlN , $\text{Al}_x\text{Ga}_{1-x}\text{N}$, and AlBN , where $0 < x < 1$; and
 - at least five pairs of $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$ layers deposited on said interlayer;
 - a second interlayer deposited on said $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$ layers, said interlayer comprising a material selected from AlN , $\text{Al}_x\text{Ga}_{1-x}\text{N}$, and AlBN , where $0 < x < 1$; and
 - at least five pairs of $\text{Al}_y\text{Ga}_{1-y}\text{N}/\text{GaN}$ layers deposited on said second interlayer, thereby forming a supported distributed Bragg reflector.
14. A supported semiconductor lattice structure, comprising:
 - a substrate;
 - a nucleation layer deposited on said substrate, said nucleation layer promoting continuous growth of subsequent deposited layers;
 - an interlayer deposited on said nucleation layer, said interlayer comprising a material selected from an $(\text{Al}, \text{Ga}, \text{B})\text{N}$ material, said interlayer having a thickness greater than approximately 20 Angstroms and less than approximately 1000 Angstroms;
 - a layer of $(\text{Al}, \text{Ga}, \text{B})\text{N}$ material deposited on said interlayer.